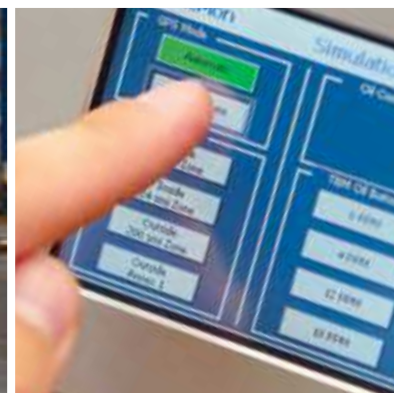


Advanced Bilge Water Treatment and Monitoring

Environmental protection solutions from SKF Marine



Advanced bilge water treatment.



Every ship owner and every ship operator knows the problem: oily bilge water is generated by oil leaking from the equipment in the machinery space of vessels as a result of routine operations. In addition, water assembles due to condensation or during the course of cleaning work. In this way, mixtures of oil, water and solids – among other emulsifying ingredients – combine to form “oily bilge water”. This should be treated in accordance with the requirements of MEPC.107(49) as mandated by MARPOL. The Integrated Bilge Water Treatment System (IBTS), as set out in MEPC.1/Circ.642, is a technique for minimizing the amount of oily bilge water by treating all components of the oily water separately.

Improving performance, environmental compatibility and safety.

The better the bilge water treatment process, the longer the lifetime of the various technical components. Most oily water separators are mainly equipped with filtering or adsorbing materials or coalescers. Such parts are extremely sensitive to solid matter. And the higher the level of oil or solid contamination within the oily water, the more often the elements have to be replaced.

Previously, the oily bilge water holding tank served as a buffer tank. Basic pre-separation also took place here through gravity separation. However, sufficient and adequate separation of oil and solids was practically impossible. Solids could be filtered in the suction lines to a limited extent only.

The Turbulo Approach: interfering in an earlier stage.

The big advantage of the new method is the preliminary removal of oil and solids. Thus a two-step system is provided:

1. Removal of the oil from the holding tank using an oil skimming system with the Turbulo Sludge Buoy system
2. Removal of the solids by simple filtration upstream of the oily water separator (OWS) with the Turbulo SolidMaster

By applying this system, the process chain will stay cleaner and the equipment will simply operate better.

Two stages for sustainable and MARPOL compliant bilge water separation and reliable recording

Once the separation processes are completed and the oil is separated from the water, the technical, regulatory and environmental tasks are fulfilled. But in order to report and document the compliance with several regulations, the monitoring solutions offer enormous advantages, for example in contact with state authorities. Furthermore monitoring helps to reduce the crew's workload by automating the measurement and logging process.

STAGE 1

Bilge water treatment, three successive steps

1. Turbulo Sludge Buoy:

Pre-separation of oil

2. Turbulo SolidMaster:

Pre-filtration of suspended solids

3. Turbulo-MPB Bilge Water Separator:

Separation of bilge water in the framework of oil-water separation

STAGE 2

Monitoring Solutions, two high-quality options

Turbulo HycalLogger:

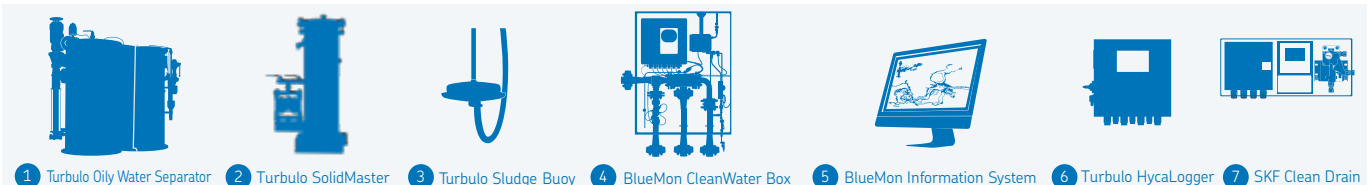
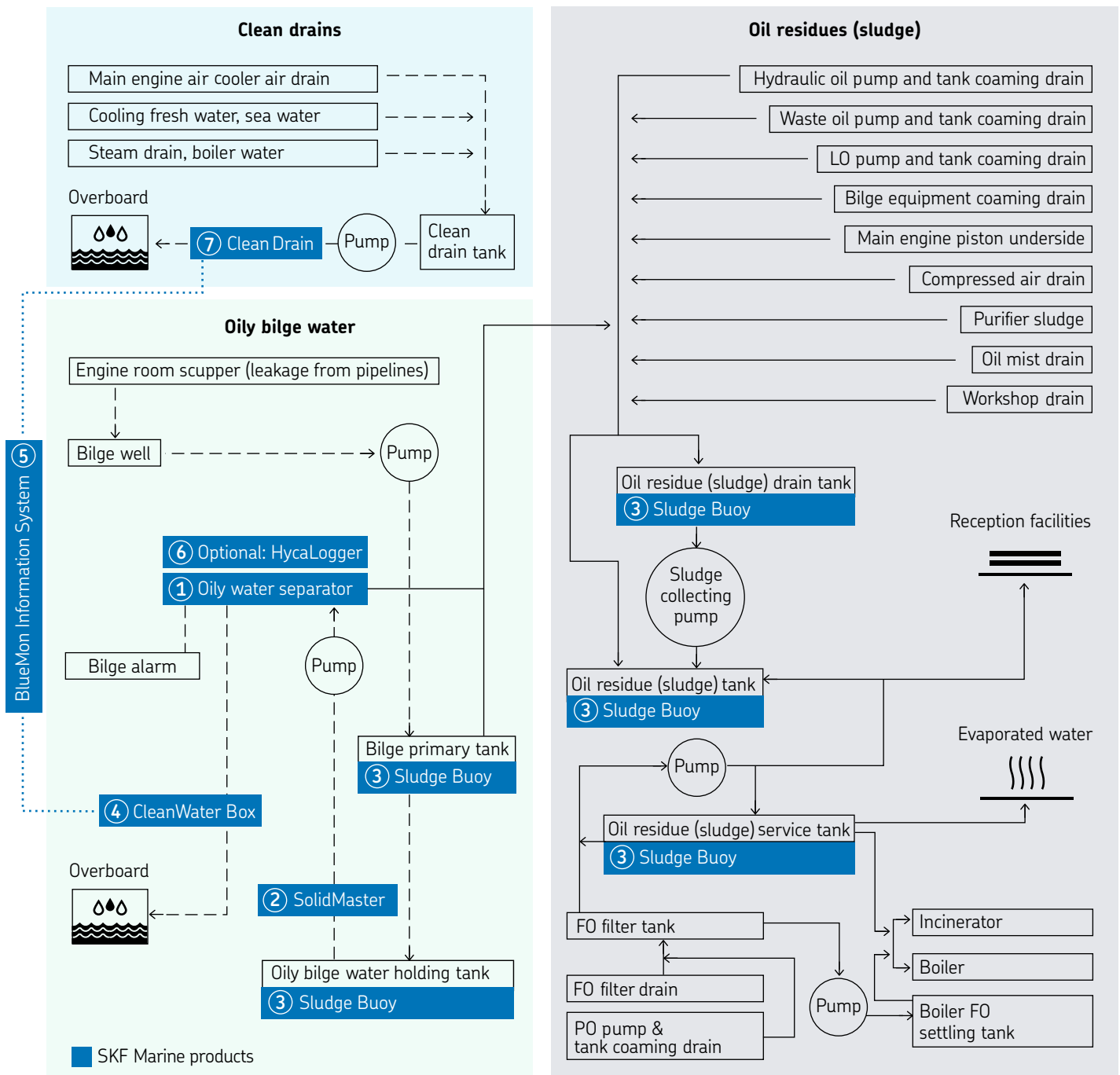
Recording the bilge water discharge process from the oily water separator

SKF BlueMon System:

Comprehensive monitoring and mapping system for various onboard emissions

The advanced bilge water treatment process

Flow Diagram – Enhancing an advanced Bilge Water Treatment System (IBTS) with SKF Marine Products



Comprehensive portfolio for the Integrated Bilge Water Treatment System

SKF Marine has been building Turbulo oily water separators since 1924. With this wealth of know-how and our proven track record, we are able to supply reliable, trouble-free, low-maintenance bilge water treatment technologies for all types of vessels. SKF Marine offers a variety of products necessary to support the IBTS and thereby the prevention of oil pollution:

The Turbulo Sludge Buoy System employs pre-separation technology. It is a mechanical device that provides fast and easy oil and water separation in the oily bilge water holding tank. The Turbulo-MPB Bilge Water Separator is a two-stage oily water separator that is suitable for use onboard any ship or offshore platform. In addition, SKF BlueMon is a comprehensive monitoring and mapping system that is applicable to vessel emissions subject to MARPOL 73/78 Annex I and VI.

Finally, SKF Clean Drain encompasses an oil content monitor for continuous oil-content measuring and status recording. The system also provides a sea to bilge (three-way) valve for safe routing of clean water overboard. SKF Clean Drain is installed downstream of the clean drain tank and controlled by SKF BlueMon.

Two new innovative systems complete the versatile product range: Turbulo SolidMaster and Turbulo HycalLogger.

The Turbulo SolidMaster is a very effective filtration system that precedes an oily water separator (OWS) and mechanically removes suspended solids in the bilge water.

Furthermore, the Turbulo HycalLogger is an electronic log book that records raw data from the OWS, for example all oil discharges. The system utilizes several sensors on the OWS and documents the bilge water discharge process. Especially for new building projects, the Turbulo HycalLogger can achieve great results in order to meet the standards of the big oil companies.



Turbulo Sludge Buoy



Advantages:

- Continuous gravity separation of free oil in tanks
- Floating rod-guided separating disc with an integrated buoy as one unit
- No risk of deposits entering from the holding tank into the following piping system because the deepest point of the Turbulo Sludge Buoy does not reach the bottom
- Improvement of downstream treatment processes
- Problem-free combustion due to low water content in the oil
- Reduced cost for onshore disposal
- Lower water content in the sludge oil
- Water separated more effectively
- Reduced load on the oily water separator
- Lower costs for consumables in oily water separator
- Easy to install by ship crew when tank is opened for inspection
- Short payback time
- No certificates needed
- Supports fulfilment of ISO 14001 standards

This mechanical device provides fast and easy oil and water separation to eliminate the need for laborious manual tank drainage processes. It is quick to install and floats inside the onboard tanks for constant, hassle-free and effective separation at source. Once installed, it can replace the primary bilge tank. In operation, the free oil in the tank flows into the Turbulo Sludge Buoy's lower compartment at a maximum rate of 6m³ per hour, before it is either pumped out or flows out under gravity – depending on the position of the drain. Removing the free oil from a tank also means that the separated oil is free of water and can thus be handled and disposed of as a single type of liquid and not as a mixture.

Description:

- Separation of up to 6 m³/h pure oil
- Function independent of the inclination of the vessel due to cardan shaft mounting
- Also operates in a high ambient temperature
- Reliable, low maintenance
- 100% oil resistant
- No consumables
- No power consumption
- No spare parts

Turbulo SolidMaster



After the Turbulo Sludge Buoy's installation, the Turbulo SolidMaster serves as filtration system which precedes the oily water separator (OWS) and mechanically removes suspended solids in the bilge water. Doing this before running the bilge water through the separator helps avoid the formation of suspensions and thereby extends the lifetime of the – more expensive – separation elements of the OWS.

Description:

- Pre-filter housing with the TORC (Turbulo Onboard Reusable Cartridge) system inside to protect the OWS from solid matter
- Perfect results only in combination with Turbulo Sludge Buoy
- Delivered with its own pump

Advantages:

- The water delivered to the OWS is almost free of solid matter
- Reliable and operator-friendly technology: Turbulo SolidMaster integrates a buffer tank functionality for the oily water separator located downstream
- Operator-friendly maintenance and handling: easy access to exchange the filter bags
- Reliable components and DIN ISO 9001 certified production process at SKF Marine
- Final manufactured unit, fully tested and delivered ready-to-use to any shipyard worldwide
- Retrofit solutions available:
 - Small footprint

- Easy to install – skid-mounted for convenient handling
- Simplified installation procedure
- No OEM commissioning engineer necessary

Turbulo-MPB Bilge Water Separator



A two-stage oily water separator that is suitable for use onboard all types of ships and offshore platforms. The first stage is a pressure system, with oleophilic coalescer inserts, that operates on a gravitational principle. Oily water is passed through the separator via a helical rotor pump and the separated oil is drained by means of automatic level control. There is a heating coil to address heavy fuel oil scenarios. The second stage features HycaSep (hydrocarbon separator) elements which coalesce finest oil particles. An IMO-certified 15 ppm oil content monitor is included.

Description:

- Turbulo-MPB (Mechanical Phase Breaker) designed, type-tested and approved pursuant to resolution MEPC107(49)
- TMPB fulfils 5 ppm criteria

- TMPB can treat oil/water mixtures and emulsions pursuant to resolution MEPC107(49)
- 6 capacities: 0.25 / 0.5 / 1.0 / 2.5 / 5.0 / 10.0 m³/h
- The TMPB is of the pressure type – the pump can be supplied separately and installed in new build and retrofit applications
- No use of chemicals or charcoals

Advantages:

- Reliable and operator-friendly technology:
 - Automatic operation (oil drain by level electrode/discharge by pneumatic oil discharge valve)
 - Continuous oil content measuring and status recording
 - Approved alarm and monitoring concept
 - Dry-run protection of pump

- Operator-friendly maintenance and handling:
 - Easy access to the inside of the separator from above
 - No need to dismount pipes and fittings
 - Precise condition monitoring and condition-based maintenance of elements
- Low operational costs:
 - No use of chemicals, charcoals or active carbon
 - No sludge through chemicals
 - No backflushing required (low freshwater consumption)
 - Protection of the top HycaSep elements
- Reliable components and DIN ISO 9001/MED-certified production process at SKF Marine
- Final manufactured unit, fully tested and delivered ready-to-use to any shipyard worldwide
- Retrofit and customized solutions available
 - Small footprint
 - Easy to install – skid-mounted for convenient handling
 - Simplified installation procedure
 - No OEM commissioning engineer necessary
 - No chemicals required for commissioning

Turbulo Service



The Turbulo product portfolio encompasses plants for onshore, offshore, and shipping applications. Whether you need technical support, system consultation, type approval or emergency service – our qualified technicians are on call 24/7 all over the world. Of course, we only install original spare parts to ensure that the type and class approvals always remain valid.

Initial consultation, planning, technical support for new build and retrofit:

- Complimentary initial consultation
- Initial installation of components
- Commissioning of the components onboard
- Familiarisation training for the crew

Regular service, spare parts and consumables:

- Outstanding OEM quality of spare parts and consumables
- GEPANU online system for verifying certified original spare parts
- High availability of replacement parts
- Conversion of MEPC.60(33) to MEPC.107(49)
- 15 ppm bilge alarm calibration service
- Bilge water analyses in our own laboratory: Analysis of particle distribution, determination of solid matter concentration, determination of the interfacial tension, determination of the oil content using gas chromatography, determination of the degree of emulsification using flow potential measurements, viscometry

- Particle and UV oil content measurement on-site
- Crew training relating to MEPC107/(49) certification
- Qualified service technicians worldwide
- Standardised service reports worldwide
- Offshore service pursuant to the Bosiet certification

Emergency service:

- 24/7 hotline with technical support
- Emergency service support
- Highest availability and express delivery of standard components and spare parts

Turbulo HycaLogger



The Turbulo HycaLogger is an electronic log book for recording raw data from the oily water separator (OWS) such as all oil discharges from the OWS. The system utilises several sensors on the OWS and documents the bilge water discharge process:

- Oil content
- GPS (latitude and longitude) position, including time and date
- Position of sea/bilge valve
- Flow rate capacity of the OWS via an external flow sensor

Description:

- 4.3 inch display showing actual values and control buttons
- USB port to connect an external device to export the logged data
- Tracking of OWS data, easy connection to other sensors that need tracking

Advantages:

- Data are recorded in a database that can be exported into a csv-file if needed
- Can be mounted directly onto the OWS or placed somewhere adjacent to it



SKF BlueMon Environmental Monitoring System



As part of our commitment towards helping our worldwide clients protect the environment, we have adapted the latest technologies in the development of a special environmental monitoring system called SKF BlueMon. This is the first comprehensive system on the market that enables the crew to automatically collect and record all of the connected incoming/outgoing sensor signals relating to the ship's emissions in one centralised system on a 24/7 basis. The special software assists in the visualisation of the collected information and stores the data for a minimum of 24 months. SKF BlueMon provides real-time situational awareness: It automatically measures and logs various onboard emissions and it also takes into account the ship's location and adjusts emission limits to comply with those of the maritime zone in which the ship is travelling.

Description:

- Applicable to emissions on vessels subject to MARPOL 73/78 Annex I and VI
- Provides a detailed environmental fingerprint of a ship's emissions at a certain time and position
- Control of emissions according to MARPOL 73/78 Annex I and VI (optional Polar Code, PSSA) through the automatic adjustment of valves
- Efficient logging and processing of emission-related sensor data input
- Data storage for a minimum of 24 months
- Visualisation of the ship's track and all sensor values via the electronic chart/mapping application
- Compliance track: quick information about conformity to regulations at a glance

- Live update/warning to crew when approaching/entering special areas or maritime boundaries

Advantages:

- Easy installation
 - SKF BlueMon will be installed as a stand-alone system
 - Network and power connection as well as external sensor cables required
 - Suitable for new build or retrofit applications
- Modular set up
 - SKF BlueMon Information System: PC system including mapping and measurement software
 - SKF BlueMon EmBo: data logger featuring analogue and digital sensor input for Annex I
 - SKF BlueMon CleaWa: box including pipework, oil content monitor (OCM), flow meter and 3-way valve for active control of discharge operation
 - SKF BlueMon CleanAir: module featuring Modbus TCP connection for sensor input for Annex VI
- Operation
 - Easy handling and operation
 - Secure in use through different user roles
 - Reduces the crews' daily data recording routine
 - Supports the crew during port authority inspections
 - Remote data access available

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